



Release Notes for Cisco IOS Release 12.0(10)W5(18c) Feature Packs for the Cisco Catalyst 8500 CSR

November 13, 2000

These release notes describe the Cisco IOS Release 12.0(10)W5(18c) feature pack for the Catalyst 8540 and Catalyst 8510 campus switch router (CSR).



Note

All information pertains to both the Catalyst 8540 CSR and Catalyst 8510 CSR platforms, unless differences between the platforms are noted in the text.



Note

You can find the most current Cisco IOS documentation on Cisco Connection Online (CCO). These electronic documents may contain updates and modifications made after the hardcopy documents were printed. For more information about CCO, refer to “Cisco Connection Online” section on page 22.

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Introduction

List of Terms

The following terms are used throughout this document:

Feature—Networking functionality that supports network technology and hardware. For example: Double Authentication, IP Multicast over Token Ring, Voice Over IP, PPP over ATM, and so forth.

Feature Set—A group of features. For example: IP, IP Plus, Enterprise Plus, IP IPsec 56, and so forth.

Image—Software code containing a Cisco IOS feature set. The image file nomenclature, such as c800-y6-mw, c1000-bnsy40-mz, and c2500-g-l, specifies a platform, feature set, and file compression method. For example, c4500-is56i-mz indicates:

- Cisco 4500 platform: c4500.
- IP Plus IPsec 56 feature set: is56i.
- RAM compression method: mz.

Feature Pack—A small box containing hardcopy documentation and CDs that contain software images, applications and electronic documentation. Feature packs provide software upgrades for many of the Cisco hardware platforms.

Feature Pack Contents

Your feature pack contains:

- A Software Feature Pack CD-ROM with the following software:
 - Cisco IOS feature set software images that can include bundled modem firmware
 - Router Software Loader (RSL) program (a Windows 95 application) that loads images onto your Catalyst 8500 CSR
 - Trivial File Transfer Protocol (TFTP) server application (for Windows 95 only).
- Documentation CD-ROM that contains all Cisco documentation
- These release notes
- *Getting Started Fast*
- *Getting Started with the Router Software Loader*



Note If you cannot use RSL to load images, you can follow the instructions in the “Alternatives to RSL” section on page 12.

- Cisco Connection Online wallet card and sticker with service contact information
- A sticker with your feature pack’s product number.
- Software license for using Cisco software in object code form on a single access server or router.

How to Use These Release Notes

The tables in these release notes contain details about the Cisco feature packs. Use these tables to perform the following tasks before loading a software image onto a router:

1. Use Table 1, “Catalyst 8500 CSR Default Memory and Upgrade Options,” for the feature set memory requirements, factory-default memory, and available memory upgrades for your Catalyst 8510 MSR or LightStream 1010.
2. Use Table 4, “Feature Pack Product Numbers Quick Reference List,” to identify the software image you want to load.
3. Use Table 5, “Catalyst 8500 CSR Feature Packs,” to identify your feature pack and the memory required for your feature set, based on the image you load.
4. Use the tables in the “Feature Set Tables” section on page 6 to identify which features are supported in a feature set image.

System Requirements

This section describes the following topics:

- Memory Defaults and Upgrade Options, page 3
- Hardware Supported, page 3
- Software Compatibility, page 5
- Determining Your Software Release, page 5
- Product Numbers Quick-Reference List, page 6
- Feature Pack Overview Table, page 6

Memory Defaults and Upgrade Options

Table 1 Catalyst 8500 CSR Default Memory and Upgrade Options

Memory Type	Catalyst 8540 CSR Defaults	Catalyst 8510 CSR Defaults	Upgrade Options
Flash memory	16 MB	16 MB	MEM-ASP-FLC16M= MEM-ASP-FLC20M=
DRAM	256 MB	64 MB	None

Hardware Supported

Cisco IOS Release 12.0(10)W5(18c) supports the Catalyst 8500 CSR.

The following table lists the interface modules supported:

Table 2 *Catalyst 8540 CSR Interface Modules*

Part Description	Part Number
Route Processors, Switch Cards, and Daughter Cards	
Route processor	C8541CSR-RP
Switch processor	C8542CSR-SP
ACL daughter card	C8540-ACL
Layer 3	
Enhanced Gigabit Ethernet Interface Module	
Enhanced 2-port Gigabit Ethernet 16K	C85EGE-2X-16K
Enhanced 2-port Gigabit Ethernet 64K	C85EGE-2X-64K
Enhanced 2-port Gigabit Ethernet 256K	C85EGE-2X-256K
Gigabit Ethernet Interface Modules	
8-port Gigabit Ethernet 64K	C85GE-8X-64K
2-port Gigabit Ethernet 16K	C85GE-2X-16K
2-port Gigabit Ethernet 64K	C85GE-2X-64K
2-port Gigabit Ethernet 16K with ACL	C85GE-2XACL-16K
2-port Gigabit Ethernet 64K with ACL	C85GE-2XACL-64K
Fast Ethernet Interface Modules	
16 Port 10/100 UTP 16K	C85FE-16T-16K
16 Port 10/100 UTP 64K	C85FE-16T-64K
16 Port 10/100 UTP 16K with ACL	C85FE-16TACL-16K
16 Port 10/100 UTP 64K with ACL	C85FE-16TACL-64K
16-port 100-FX MT-RJ 16K	C85FE-16F-16K
16 Port 100-FX MT-RJ 64K	C85FE-16F-64K
16 Port 100-FX MT-RJ 16K with ACL	C85FE-16FACL-16K
16 Port 100-FX MT-RJ 64K with ACL	C85FE-16FACL-64K
Packet-over-SONET (POS)	
1-port POS OC-12c/STM-4 SMF-IR and 1-port Gigabit Ethernet 64K	C85-POSOC12I2I-64K
1-port POS OC-12c/STM-4 SMF-IR and 1-port Gigabit Ethernet 256K	C85-POSOC12I2I-256K
1-port POS OC-12c/STM-4 SMF-LR and 1-port Gigabit Ethernet 64K	C85-POSOC122L-64K
1-port POS OC-12c/STM-4 SMF-LR and 1-port Gigabit Ethernet 256K	C85-POSOC122L-256K
ATM Uplink	

Table 2 Catalyst 8540 CSR Interface Modules (continued)

Part Description	Part Number
1-port OC-3c/STM-1 MMF ATM Uplink and 1-port Gigabit Ethernet 64K	C85-10C3MGE-64K
1-port OC-3c/STM-1 SMF-IR ATM Uplink and 1-port Gigabit Ethernet 64K	C85-10C3SGE-64K
1-port OC-12c/STM-1 MMF ATM Uplink and 1-port Gigabit Ethernet 64K	C85-10C12MGE-64K
1-port OC-12c/STM-1 MMF ATM Uplink and 1-port Gigabit Ethernet 256K	C85-10C12MGE-256K
1-port OC-12c/STM-1 SMF-IR ATM Uplink and 1-port Gigabit Ethernet 64K	C85-10C12SGE-64K
1-port OC-3c/STM-1 SMF-IR ATM Uplink and 1-port Gigabit Ethernet 256K	C85-10C12SGE-256K

Table 3 Catalyst 8510 CSR Interface Modules

Part Description	Part Number
Route Processors, Switch Cards, and Daughter Cards	
Layer 3 Switch Route Processor	C8510-SRP
ACL daughter card	C8510-ACL=
Gigabit Ethernet Interface Modules	
1-port Gigabit Ethernet 16K	C85GE-1X-16K
1-port Gigabit Ethernet 64K	C85GE-1X-64K
Fast Ethernet Interface Modules	
8 Port 10/100 RJ-45 16K	C85FE-8T-16K
8 Port 10/100 RJ-45 64K	C85FE-8T-64K
8 Port 100-FX MT-RJ 16K	C85FE-8F-16K
8 Port 100-FX MT-RJ 64K	C85FE-8F-64K

Software Compatibility

The feature pack described in this release note contains Cisco IOS Release 12.0(10)W5(18c) software images and Router Software Loader (RSL) Version 7.10.

Determining Your Software Release

To determine the version of Cisco IOS software running on your Catalyst 8500 CSR, log in to the Catalyst 8500 CSR, and enter the **show version** user EXEC command.

```
Switch#show version
Cisco Internetwork Operating System Software
IOS (tm) L3 Switch/Router Software (C8540CSR-IN-M), Version 12.0(10)W5(18c)
```

Product Numbers Quick-Reference List

Table 4 Feature Pack Product Numbers Quick Reference List

Product Number	Feature Pack Description
CD851R3-12.0.10W=	Catalyst 8510 Layer3 feature set
CD854R3-12.0.10W=	Catalyst 8540 Layer3 feature set

Feature Pack Overview Table

Table 5 Catalyst 8500 CSR Feature Packs

Product Number	CD-ROM Title	Image Name(s)		Recommended Memory	
		UNIX	DOS	Flash	Main
CD851R3-12.0.10W=	Catalyst 8510 Layer 3 Feature Set Cisco IOS Release 12.0(10)W5(18b)	cat8510c-in-mz.120-10. W5.18b.bin	aaa1588	16 MB	64 MB
CD854R3-12.0.10W=	Catalyst 8540 Layer 3 Feature Set Cisco IOS Release 12.0(10)W5(18c)	cat8540c-in-mz.120-10. W5.18c.bin	aaa1589	16 MB	256 MB

Feature Set Tables

Table 6 through Table 16 list the features and feature sets supported by the Catalyst 8500 CSR in Cisco IOS Release 12.0(10)W5(18c).



Note

These feature set tables contains only a selected list of features. These tables are not a cumulative or complete list of all the features in each image.

This section lists the Catalyst 8500 CSR software features.

Table 6 *Layer 2 Bridging Feature Set Supported by the Catalyst 8500 CSR*

Layer 2 Bridging Features
Layer 2 transparent bridging
Layer 2 MAC learning, aging, and switching by hardware
Spanning Tree Protocol (IEEE 802.1d) support per bridge group
Spanning Tree SNMP trap support
Support for a maximum of 64 active bridge groups
Integrated routing and bridging (IRB) mode support
CPU redundancy ¹

1. CPU redundancy for the Catalyst 8510 CSR

Table 7 *VLAN Feature Set Supported by the Catalyst 8500 CSR*


Virtual LAN (VLAN) Features
Inter-Switch Link (ISL)-based VLAN trunking
802.1Q-based VLAN routing/bridging support
 Note Untagged packets arriving on a native VLAN are handled by the CPU, rather than the microcode. Also see the “VLAN Encapsulation Restrictions” section on page 16.

Table 8 *Layer 3 Routing, Switching, and Forwarding Feature Set Supported by the Catalyst 8500 CSR*



Layer 3 Routing, Switching, and Forwarding Features
IP, IPX, and IP multicast routing and forwarding between Ethernet ports
IP fragmentation support for POS/ATM uplink
AppleTalk 1 and 2 routing
 Note See the “AppleTalk Restrictions” section on page 16.
Constrained multicast flooding (CMF)
IP multicast routing with up to 12,000 groups (S, G) with 16 outgoing interfaces on the Catalyst 8540 CSR
IP multicast routing with up to 6,000 groups (S, G) with 8 outgoing interfaces on the Catalyst 8510 CSR
 Note Multicast routing is not supported over BVI.
Up to 128 IP multicast groups
QoS-based forwarding based on IP precedence

Table 8 *Layer 3 Routing, Switching, and Forwarding Feature Set Supported by the Catalyst 8500 CSR*

Layer 3 Routing, Switching, and Forwarding Features (continued)

Load balancing among two equal-cost paths based on source and destination IP and IPX addresses

Up to 6 equal-cost paths for IP and IPX; per-packet load balancing for IPX

Table 9 *Supported Routing Protocols Feature Set Supported by the Catalyst 8500 CSR*

Supported Routing Protocols

BGP (Border Gateway Protocol)

RIP and RIP II (Routing Information Protocol)

IGRP (Interior Gateway Routing Protocol)

EIGRP (Enhanced Interior Gateway Routing Protocol)

OSPF (Open Shortest Path First)

IPX (Internet Packet Exchange) RIP and EIGRP

PIM (Protocol Independent Multicast)—sparse and dense modes

RTMP (AppleTalk Routing Table Maintenance Protocol)

AURP (AppleTalk Update-based Routing Protocol)

Secondary addressing

Static routes

Classless Interdomain Routing (CIDR)

Table 10 *Fast EtherChannel Feature Set Supported by the Catalyst 8500 CSR*

Fast EtherChannel (FEC) Features

Bundling of up to four Fast Ethernet ports in a maximum of 64 FECs

Load sharing based on source and destination IP addresses of unicast packets

Load sharing for bridge traffic based on MAC address

ISL trunking (routing/bridging)

802.1Q routing/bridging

Up to 56 active FEC and GEC port channels in one system



Note See the “Catalyst 8540 ACL Daughter Card Restrictions” section on page 15 for restrictions on FEC.

Table 11 *Gigabit EtherChannel Feature Set Supported by the Catalyst 8500 CSR*


Gigabit EtherChannel (GEC) Features	
Bundling of up to four Fast Gigabit Ethernet ports in a maximum of 56 FECs	
Load sharing based on source and destination IP addresses of unicast packets	
Load sharing for bridge traffic based on MAC address	
ISL trunking (routing/bridging)	
ISL on the Fast EtherChannel	
802.1Q routing/bridging	
Up to 56 active FEC and GEC port channels in one system	
Up to 64 active FEC and GEC port channels in one system	
	
Note	See the “Catalyst 8540 ACL Daughter Card Restrictions” section on page 15 for restrictions on GEC.
Bundling of up to four Gigabit Ethernet ports	

Table 12 *Enhanced Gigabit Ethernet Feature Set Supported by the Catalyst 8500 CSR*

Enhanced Gigabit Ethernet Features	
Two 1-port enhanced Gigabit Ethernet port adapters with built-in ACL functionality and 16, 64, or 256 KB of memory available for routing tables	
1-port packet-over-SONET OC-12c uplink port adapter with built-in ACL functionality and a 1-port enhanced Gigabit Ethernet port adapter	

Table 13 Access Control Lists Feature Set Supported by the Catalyst 8540 CSR**Access Control Lists (ACL)**

Layer 2 filtering:

- MAC address filtering standard ACL

Layer 3 filtering using an ACL daughter card:

- IP simple ACL (1-99, 1301-1999)
- IP extended ACL (100-199, 2000-2699)
 - TCP ACL based on TCP-precedence, TCP port number, TCP ToS, and TCP flags
 - UDP ACL based on UDP port number
 - ICMP ACL
- IPX standard ACL (800-899) without source node
- IOS ACL for control plane traffic (for example, route update filter, etc.)
- Named ACL



Note See the “Catalyst 8540 ACL Daughter Card Restrictions” section on page 15.

Table 14 ATM Uplink Feature Set Supported by the Catalyst 8540 CSR**ATM Uplink**

ATM uplink: UNI 3.0

ATM uplink: UNI 3.1

ATM uplink: ILMI 3.1

ATM uplink: RFC 1483 for bridging

ATM uplink: RFC for routing (IP, IP multicast, IPX)

ATM uplink: RFC 1483 SVC support

ATM uplink: 13-bit virtual circuit number with up to 8K VCs

ATM uplink 4096 simultaneous SARs

ATM uplink: AAL 5

Table 15 Packet-over-SONET (POS) Feature Set Supported by the Catalyst 8540 CSR**Packet-over-SONET (POS)**

POS: RFC 1619 PPP over SONET/SDH

POS: RFC 1662 PP in HDLC-like framing

POS: IP fragmentation for POS and ATM uplink

POS: SONET MIB as defined in RFC 1575

POS: Transparent Bridging (PPP/HDLC encapsulation)

POS: SPE payload scrambling

Table 15 *Packet-over-SONET (POS) Feature Set Supported by the Catalyst 8540 CSR (continued)***Packet-over-SONET (POS)**

POS: SONET alarms (LOS, LOF, AIS, and RDI detection/reporting)

POS: Threshold Crossing Alerts for B1, B2, B3 with configurable thresholds

Table 16 *Additional Protocols Feature Set Supported by the Catalyst 8500 CSR***Additional Protocols Supported**

BOOTP (Bootstrap Protocol)

CGMP (Cisco Group Management Protocol) server support

CDP (Cisco Discovery Protocol) support on Ethernet ports

DHCP (Dynamic Host Configuration Protocol) Relay

HSRP (Hot Standby Routing Protocol) over 10/100 Ethernet, Gigabit Ethernet, FEC, GEC, and BVI (Bridge-Group Virtual Interface)

ICMP (Internet Control Message Protocol)

IGMP (Internet Group Management Protocol)

IPX SAP (Internet Packet Exchange Service Advertisement Protocol) and SAP filtering

IRB (integrated routing and bridging) routing mode support

SNMP (Simple Network Management Protocol)

Maximum of 32 active bridge groups with BVI

Route filtering

ISL support on the GEC

802.1 routing support on the GEC

Group Virtual Interface (BVI)

Support for up to 200 IPX networks on interfaces and subinterfaces

1-port packet-over-SONET OC-12c uplink port adapter with built-in ACL functionality and a 1-port enhanced Gigabit Ethernet port adapter

IS-IS routing protocol

Switching database manager

ATM uplink: F4 and F5 flows of OAM cells

ATM uplink: Traffic shaping

Installation Notes

This section describes the following topics:

- Image Installation Tips and Troubleshooting When Using RSL, page 11
- Alternatives to RSL, page 12

Image Installation Tips and Troubleshooting When Using RSL

Image Installation Tips

The following information about RSL operations can help you with the installation process:

- If you are loading software on a preconfigured Catalyst 8500 CSR, save the configuration file on your PC before running RSL.
- If you have added any static entries to the PC Address Resolution Protocol (ARP) table, one or more of them might be deleted by RSL. Manually reenter any deleted entries in the PC ARP table.
- During a connection, if the Catalyst 8500 CSR running configuration is not the same as its startup configuration, the exact configuration is not restored. Any changes that you made since the last time you entered **copy running-config startup-config** or **write memory** commands are lost.
- RSL restores the Catalyst 8500 CSR startup configuration, but some running configuration commands are not restored. To restore the exact running configuration, reboot the router. The following interface configuration commands are not restored to the running configuration:
 - **no shutdown**
 - **no ringspeed**
 - **media-type aui**

Recovering from a Connection Error

If any of the following elements apply to your installation, modify the Short Timeout value from the Options dialog box in RSL:

- You are connecting to a router or access server that has a large configuration file.
- You are connecting to a Catalyst 8500 CSR that has a large configuration file.
- You see the following error message:

```
"Failed to configure the router to enable the Cisco IOS software image and configuration
file upload and download operations. You may want to check the router to make sure that
the selected interface exists."
```

If you are connecting to any other router or access server, increase the Short Timeout to a value over 25 seconds.



Note

If you change the timeout value, you must do so before connecting to the Catalyst 8500 CSR, or the new value will not be used. Also, increasing the Short Timeout value can increase the time it takes for RSL to connect to the target Catalyst 8500 CSR.

Restoring the Startup Configuration

In some cases, RSL is unable to restore the startup configuration. If this happens, follow these steps:

- Step 1** Ensure that all cables are properly attached to both the Catalyst 8500 CSR and the PC.
- Step 2** Restart RSL and connect by using the **Preconfigured router** option.
- Step 3** When asked if you want to overwrite the existing startup configuration file, choose **no**.

- Step 4** When asked if you want to continue, choose **yes**.
- Step 5** When the Catalyst 8500 CSR is connected, select **Download Router Configuration** in the Router Software Loader dialog box.
- Step 6** Select the appropriate file and click the radio button beside **Copy configuration to the router nonvolatile memory**. The Catalyst 8500 CSR should now contain the startup configuration it had before the initial RSL connection.
- Step 7** Exit RSL.



Note In the steps above, the Catalyst 8500 CSR configuration register (**config-register 0xnnnn**) is not restored.



Note If you press **Ctrl-Alt-Delete** to quit RSL, the router configuration and the configuration register are not restored. However, the configuration file is not deleted from the PC. To restore the configuration file, follow the steps above, beginning with Step 2.

Alternatives to RSL

RSL is designed to work with a PC running Microsoft Windows 95 and is the recommended method for downloading software to the Catalyst 8500 CSR; however, you can install the software using the TFTP process described in the following section.



Note The sample prompts and output shown in the following sections might not be identical to the prompts displayed on the Catalyst 8500 CSR console.

Installing the Catalyst 8500 CSR Software by Using a TFTP Server Application

Use this TFTP server application method as an alternative method to install the Catalyst 8500 CSR software from the CD-ROM. You can perform this procedure by using a PC (running Microsoft Windows 95 or Microsoft Windows 3.1), a Macintosh, or a UNIX system. You can use either the **copy tftp flash** or **copy rcp flash** command to download the software to the Catalyst 8500 CSR.

First, obtain a TFTP application or a remote copy protocol (rcp) application to set up your computer as a TFTP server or an rcp server. If you are using a PC running Windows 95, you can use RSL or the TFTP server included on the feature pack CD-ROM to install the Catalyst 8500 CSR software. For other operating systems, a number of TFTP or rcp applications are available from independent software vendors, or as shareware on the World Wide Web.



Note To use an rcp application, follow the same procedure below, but substitute “rcp” for “TFTP” and use the **copy rcp flash** command instead of the **copy tftp flash** command.

- Step 1** Install any TFTP server application on the PC. (A PC application is included on the feature pack CD-ROM for Microsoft Windows 95 only.)

Step 2 Start the TFTP server application on the PC by double-clicking the application icon or its .exe filename.

Step 3 Set up the PC as a TFTP server by using the TFTP server application setup or configuration facility. Most TFTP server applications include a setup facility that allows you to specify the PC as a server. For example, from the TFTP menu of one application, select **Settings** to display a panel. To configure the local PC as a server, select the Server checkbox.

Select a root directory where the Cisco IOS files reside (for example, d:\cpswinst\images).

**Caution**

Make sure you set up your local PC as a TFTP server. If you do not, you cannot perform the copy procedure. This caution applies to both TFTP and rcp.

Step 4 Establish a console session from your local PC (which is now configured as a TFTP server) to the Catalyst 8500 CSR by using one of these methods:

- Connect the PC com port to the Catalyst 8500 CSR console port.
This is the recommended method. When you reload the Catalyst 8500 CSR with the new image in Step 13, you remain connected to the Catalyst 8500 CSR.
- Establish a Telnet session from the PC to the Catalyst 8500 CSR. If you choose to use Telnet, your connection to the Catalyst 8500 CSR will be lost when it is reloaded.

**Caution**

Make sure that your PC is set up to communicate with the connected device through its network port.

Step 5 Connect your PC's LAN port to the corresponding LAN port on the Catalyst 8500 CSR. If you are making a direct connection to the Catalyst 8500 CSR via Ethernet or Fast Ethernet, use an Ethernet crossover cable. If connecting to the Catalyst 8500 CSR via an Ethernet or Fast Ethernet hub or Token Ring MAU (hub), use straight-through cable.

**Note**

We recommend that you back up the Catalyst 8500 CSR configuration before upgrading the Catalyst 8500 CSR software.

Step 6 At the prompt, enter your password:

```
Password: <password>
```

Step 7 At the prompt, enter **enable**; then enter your password:

```
Router# enable
Password: <password>
```

Step 8 At the prompt, enter the following command to copy the new software image from the PC CD-ROM drive to the Catalyst 8500 CSR:

```
Router# copy tftp flash
```

In the next series of steps, you download the Cisco IOS Release [XX.X](#) images that you want installed on your Catalyst 8500 CSR.

Step 9 At the prompt, enter the IP address of your PC, as shown in the following example:

```
Address or name of remote host [255.255.255.255]? 131.108.1.1
```

This is the IP address of your local PC, not that of the Catalyst 8500 CSR.

- Step 10** At the prompt, enter the filename of the Cisco IOS Release 78-7045-08 image to be copied to the Catalyst 8500 CSR, as shown in the following example:

```
Source file name? cat8540c-in-mz.120-10.W5.18c.bin
```

This example specifies the UNIX image name of the IP feature set for Catalyst 8500 CSR (as shown in Table 5 in the “Feature Pack Overview Table” section on page 6).

- Step 11** At the prompt, enter the destination UNIX image filename and press **Enter**.

This is the name of the image file on the Catalyst 8500 CSR—not the full pathname of the image on the CD-ROM attached to the PC. Refer to Table 5 in the “Feature Pack Overview Table” section on page 6 for the UNIX image filename.

```
Destination file name [cat8540c-in-mz.120-10.W5.18c.bin]?
```

During the transfer process, the software displays messages indicating that it has accessed the file you have specified and is loading it.

- Step 12** At the prompt, enter **yes** if you want to erase the existing image copy resident in the Catalyst 8500 CSR Flash memory before copying the new one.

```
Erase flash device before writing? [confirm] yes
```

The entire copying process takes several minutes and differs from network to network.

The exclamation point (!) indicates that the copy process is taking place. Each exclamation point (!) indicates that ten packets have been transferred successfully. A checksum verification of the image occurs after the image is written to Flash memory.

- Step 13** Enter the **reload** command to reload the Catalyst 8500 CSR:

```
Router# reload
```

After the reload is complete, the Catalyst 8500 CSR should be running the required Cisco IOS image. Use the **show version** command to verify it.

About Application Notes

We recommend that you read the following application notes before configuring your switch router:

- 8 Port Gigabit Ethernet Local Switching Line Card for the Catalyst 8540 CSR
- ACL Daughter Card for the Catalyst 8540

Minimum Flash Memory Requirement

The Catalyst 8500 CSR ships with an 16 MB systemcode Single In-Line Memory Module (SIMM) for the onboard Flash memory software image.

To download and store a copy of the Catalyst 8500 CSR software image, we recommend using a minimum 20 MB Flash PC Card. This will allow you to have two or more images installed at the same time. See the “Memory Defaults and Upgrade Options” section on page 3.

To Boot From a Flash PC Card

The Catalyst 8500 CSR boots from its onboard Flash memory by default. To change this default to boot from a Flash PC Card instead, you must change the configuration register setting to 0x2102. Detailed instructions can be found in the *Layer 3 Switching Software Feature and Configuration Guide*.

Restrictions

This section describes the following Catalyst 8500 CSR restrictions:

- Catalyst 8540 ACL Daughter Card Restrictions
- AppleTalk Restrictions
- VLAN Encapsulation Restrictions
- EtherChannel Restrictions
- Maximum Path Restriction for EIGRP or OSPF
- Port Snooping Restrictions
- Eight-Port Gigabit Ethernet — Ports Per Bridge Group Restriction
- Eight-Port Gigabit Ethernet — Ports Per Bridge Group Restriction
- Eight-Port Gigabit Ethernet — Port Channel Restrictions
- Restrictions on the Online Insertion and Removal of Modules
- FPGA Upgrade Restriction
- 1000BaseZX GBIC Restriction

Catalyst 8540 ACL Daughter Card Restrictions

The eight-port Gigabit Ethernet interface does not support an ACL daughter card.

The Catalyst 8510 CSR does not support an ACL daughter card.

UDP flooding is disabled on routers with an ACL daughter card.

The following ACLs are not supported with the ACL daughter card:

- ACL for GEC, FEC, or BVI
- Dynamic ACL
- Reflexive ACL
- IPX extended ACL
- ACL logging

AppleTalk Restrictions

We recommend that you evaluate the level of CPU utilization and performance in your switch router before turning on AppleTalk, particularly in a Catalyst 8510 CSR. Unlike IP and IPX, AppleTalk routing and processing in the Catalyst 8500 CSR is accomplished by the switch processor, not the interface module. This means that routing AppleTalk packets consumes more processing time than

routing other protocol packets. In a switch with a sustained high CPU utilization, turning on AppleTalk could result in longer convergence times for routing protocols like EIGRP. AppleTalk packet throughput is dependent on the amount of available CPU processing power.

VLAN Encapsulation Restrictions

The four adjacent ports (such as 0-3 or 4-7) on a 10/100 interface must all use the same VLAN encapsulation, that is, either 802.1Q and native, or ISL and native.

EtherChannel Restrictions

When assigning Ethernet interfaces to an EtherChannel, all interfaces must be either Fast Ethernet or Gigabit Ethernet. You cannot mix Fast Ethernet and Gigabit Ethernet interfaces within a single EtherChannel.

Maximum Path Restriction for EIGRP or OSPF

Catalyst 8500 line modules support a maximum of 2 paths. To improve EIGRP or OSPF convergence, set the **maximum-paths** for the router to 2, using the following command:

```
8500(config)#router eigrp 109
8500(config-router)#maximum-paths 2
```

Port Snooping Restrictions

The snooping source port and destination port cannot be the same port.

You can only snoop with one source port and one destination port.

Snooping configuration information is not saved in NVRAM.

Eight-Port Gigabit Ethernet — Ports Per Bridge Group Restriction

The Catalyst 8540 8-port Gigabit Ethernet line module can support a maximum of 24 ports per bridge group.

Eight-Port Gigabit Ethernet — Port Channel Restrictions

If your Catalyst 8540 CSR has an 8-port Gigabit Ethernet line module, you cannot create a port channel that has some members on that module and others on other modules. All port channel members must reside on the same Gigabit Ethernet line module.

Also, if your switch router has an 8-port Gigabit Ethernet line module, port channel IDs 57 to 64 are reserved, and cannot be assigned to other external interfaces. If you assign a port channel ID number greater than 56, the system will respond with the following message:

Port channel with ID > 56 cannot be created.

If you have already assigned port channel IDs 57 to 64, you must reassign them before installing an 8-port Gigabit Ethernet line module.

If your switch router does not have an 8-port Gigabit Ethernet line module, you can assign port channel ID numbers up to 64.

Restrictions on the Online Insertion and Removal of Modules

The following restrictions apply to the online insertion and removal (OIR), also known as hot swapping, of line modules on the Catalyst 8500 CSR:

- Wait at least one minute after removing a line module before inserting a new one.
- Do not remove more than one line module at a time while the device is operational.

FPGA Upgrade Restriction

On an 8540 CSR, the **reprogram** command for upgrading the FPGA on the switch processor requires power cycling the box after completing the FPGA download.

1000BaseZX GBIC Restriction

The Catalyst 8510 and 8540 CSR systems support extra long haul (1000BaseZX) GBICs as follows:

- **Catalyst 8540 CSR:** A maximum of 12 1000BaseZX GBICs per system to comply with FCC Class A emissions (CFR 47 Part 15), or 8 1000BaseZX GBICs per system to comply with EN55022 Class B emissions (CISPR22 Class B).
- **Catalyst 8510 CSR:** Up to four 1000BaseZX GBICs in a total of four Gigabit Ethernet line modules to comply with radiated emissions requirements.

Catalyst 8540 CSR Route Processor and Switch Module Redundancy

The Catalyst 8540 CSR supports the use of redundant route processors and switch modules. The second route processor would be installed in slot 8, and an additional switch module would be installed in slot 6.

Route Processor

There are some precautions that need to be taken before removing a route processor module from a chassis that is powered-up. If a route processor module that is currently running IOS is removed from the chassis in a skewed manner such that the left side of the processor comes out before the right side does, the traffic flowing through the device may stop flowing.

To avoid this, make sure the route processor module that is being removed is currently at the ROM monitor prompt; it is then safe to remove it from the chassis. One way to get the system into ROM monitor from IOS is to issue a **reload** command. This will work if the system is not configured to auto-boot. If the system is configured to auto-boot, it starts booting IOS again.

Since you need to ensure that a route processor is in ROM monitor before removing it, the **redundancy prepare-for-cpu-removal** command has been added to take the system to the ROM monitor prompt. Execute this command on the route processor being removed before removing it. Once this command is issued, the route processor will go to the ROM monitor prompt and stay there even if the system is configured to auto-boot. At this point it is safe to remove the route processor from the system.

Switch Modules

If a Catalyst 8540 CSR has three switch modules, then by default the switch modules in slots 5 and 7 come up as active, and the one in slot 6 comes up as the standby. If you wish to change this default, there is a command that lets you select the “preferred” switch module slots. This command is a privileged **exec** level command with the following format:

redundancy preferred-switch-card-slot *slot#1 slot#2*

Two unique preferred slots must be specified. The range of the slot value is 5 to 7. If one of the preferred slots is not a currently active switch module, you are informed of this and asked if the system should change the active switch modules to the preferred switch modules. If such a switch-over occurs, all the active connections in the system will be reinitialized. If you wish to continue, then the preferred switch modules become active, and the other switch module becomes the standby. This configuration will remain in effect until either one of the active switch modules is removed.

The preferred switch module configuration is preserved across route processor switch-overs. However, the preferred switch modules setting will be lost if the system is power-cycled or if both route processors are reloaded to the ROM monitor.

Autonegotiation

Beginning with Cisco IOS Release 12.0(5)W5(13) software, the autonegotiation feature for speed and duplex on 10/100BaseT Ethernet ports defaults to “on.” This means that for each port, the Catalyst 8500 CSR automatically detects the port speed (10 Mbps or 100 Mbps) and duplex of the peer port, if that port also autonegotiates.

To override autonegotiation and set a port to 10 Mbps operation, issue the following command:

```
(config-if)# speed 10
```

To set a port to 100 Mbps operation, issue the following command:

```
(config-if)# speed 100
```

To set the duplex value for a port to full-duplex, issue the following command:

```
(config-if)# duplex full
```

To set the duplex value for a port to half-duplex, issue the following command:

```
(config-if)# duplex half
```



Caution

If you connect a Catalyst 8540 CSR running Cisco IOS Release 12.0(5)W5(13) software to a router or switch running in forced full-duplex mode, you may encounter symptoms such as high collision rate or reduced throughput, as the Catalyst 8540 unsuccessfully tries to autonegotiate with the other device. When autonegotiation fails, the Catalyst 8540

defaults to half-duplex operation, which causes a mismatch between it and the other device. Possible workarounds include forcing the Catalyst 8540 to operate in full-duplex mode or removing the full-duplex command from the other device.

Line Module Interoperability with Catalyst 8540 MSR

The Catalyst 8540 CSR line modules can be used in a Catalyst 8540 MSR chassis, with an MSR route processor and switch modules. If you do this, you must use only CSR (Ethernet) line modules, and you must load either the CSR software image on the MSR or use the ATM router module with the MSR software image.

Y2K Compliance

The Catalyst 8540 CSR and 8510 CSR systems running Cisco IOS Release 12.0(0.6)W5(1) and later have been certified as Y2K Compliant. For more information, see the following URL:
<http://www.cisco.com/warp/public/752/2000/>.

Related Documentation

The following sections describe the documentation available for the Catalyst 8500 CSR. These documents consist of hardware and software installation guides, Cisco IOS configuration and command references, system error messages, feature modules, and other documents.

Documentation is available as printed manuals or electronic documents, except for feature modules, which are available online on CCO and the Documentation CD-ROM only.

Use these release notes with the documents listed in the following sections:

- Release-Specific Documents, page 20
- Feature Modules, page 20
- Cisco IOS Documentation Set, page 21

The following documents provide information related to Catalyst 8500 campus switch routers.

- Application Note: 8 Port Gigabit Ethernet Local Switching Line Card for the Catalyst 8540 CSR
- Application Note: ACL Daughter Card for the Catalyst 8540
- *Catalyst 8540 Interactive Quick Start*
- *Catalyst 8510 Interactive Quick Start*
- *Quick Reference Catalyst 8540 CSR and MSR Hardware Information*
- *Catalyst 8540 Chassis Installation Guide*
- *Quick Reference Catalyst 8510 and LightStream 1010 Hardware Information*
- *Catalyst 8510 Campus Switch Router Processor and Interface Module Installation Guide*

Release-Specific Documents

The following documents are specific to Release 12.0. They are located on CCO and the Documentation CD-ROM:

- *Release Notes for Cisco IOS Release 78-7045-08*

On CCO at:

Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.0: Release Notes: Catalyst 8540 CSR Release Notes: Catalyst 8540 CSR Cisco IOS Release 12.0 Documents: Catalyst 8540 CSR Release 12.0(10)W5(18c) Documents: Release Notes: Release Notes for the Catalyst 8500 CSR for Cisco IOS Release 12.0(10)W5(18c)

Platform-Specific Documents

These documents are available for the Catalyst 8500 CSR on CCO and the Documentation CD-ROM.

Software Documents

Here is a list of the software documentation available for the Catalyst 8540 CSR:

- *Layer 3 Switching Software Feature and Configuration Guide*
- *ATM Switch Router Quick Software Configuration Guide*
- *ATM Switch Router Command Reference*
- *ATM Switch Router Software Configuration Guide*
- *ATM Technology Guide*

On CCO at:

Cisco Product Documentation: Layer 3 Switching: Catalyst 8540 CSR Documents: Catalyst 8540 CSR Cisco IOS Release 12.0 Documents: Catalyst 8540 CSR Release 12.0(4a)W5(18c) Documents

On the Documentation CD-ROM at:

Layer 3 Switching: Catalyst 8540 CSR Documents: Catalyst 8540 CSR Cisco IOS Release 12.0 Documents: Catalyst 8540 CSR Release 12.0(4a)W5(18c) Documents

Feature Modules

Feature modules describe new features supported by Release 12.0(10)W5(18c) and are updates to the Cisco IOS documentation set. A feature module consists of a brief overview of the feature, benefits, configuration tasks, and a command reference. As updates, the features modules are available online only. Feature module information is incorporated in the next printing of the Cisco IOS documentation set.

On CCO at:

Service and Support: Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.0: New Feature Documentation

On the Documentation CD-ROM at:

Cisco IOS Software Configuration: Cisco IOS Release 12.0: New Feature Documentation

Cisco IOS Documentation Set

The Cisco IOS software documentation set consists of the Cisco IOS configuration guides, Cisco IOS command references, and several other supporting documents, which are shipped with your order in electronic form on the Documentation CD-ROM—unless you specifically ordered the printed versions.

Documentation Modules

Each module in the Cisco IOS documentation set consists of two books: a configuration guide and a corresponding command reference. Chapters in a configuration guide describe protocols, configuration tasks, Cisco IOS software functionality, and contain comprehensive configuration examples. Chapters in a command reference provide complete command syntax information. Use each configuration guide with its corresponding command reference.

You can reach these documents on CCO at:

Service and Support: Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.0: Cisco IOS Release 12.0 Configuration Guides and Command References

You can reach these documents on the Documentation CD-ROM at:

Cisco IOS Software Configuration: Cisco IOS Release 12.0: Cisco IOS Release 12.0 Configuration Guides and Command References

Release 12.0 Documentation Set

Table 5 describes the contents of the Cisco IOS Release 12.0 software documentation set, which is available in electronic form and also in printed form upon request.



Note

You can find the most current Cisco IOS documentation on CCO and the Documentation CD-ROM. These electronic documents might contain updates and modifications made after the paper documents were printed.

You can reach the Cisco IOS documentation set on CCO at:

Service and Support: Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.0

You can reach the Cisco IOS documentation set on the Documentation CD-ROM at:

Cisco IOS Software Configuration: Cisco IOS Release 12.0

Obtaining Documentation

World Wide Web

You can access the most current Cisco documentation on the World Wide Web at <http://www.cisco.com>. Translated documentation can be accessed at http://www.cisco.com/public/countries_languages.shtml.

Documentation CD-ROM

Cisco documentation and additional literature are available in a CD-ROM package, which ships with your product. The Documentation CD-ROM is updated monthly. Therefore, it is probably more current than printed documentation. The CD-ROM package is available as a single unit or as an annual subscription.

Ordering Documentation

Registered CCO users can order the Documentation CD-ROM and other Cisco Product documentation through our online Subscription Services at <http://www.cisco.com/cgi-bin/subcat/kaojump.cgi>.

Nonregistered CCO users can order documentation through a local account representative by calling Cisco's corporate headquarters (California, USA) at 408 526-4000 or, in North America, call 800 553-NETS (6387).

Obtaining Technical Assistance

Cisco provides Cisco Connection Online (CCO) as a starting point for all technical assistance. Warranty or maintenance contract customers can use the Technical Assistance Center. All customers can submit technical feedback on Cisco documentation using the web, e-mail, a self-addressed stamped response card included in many printed documents, or by sending mail to Cisco.

Cisco Connection Online

Cisco continues to revolutionize how business is done on the Internet. Cisco Connection Online is the foundation of a suite of interactive, networked services that provides immediate, open access to Cisco information and resources at anytime, from anywhere in the world. This highly integrated Internet application is a powerful, easy-to-use tool for doing business with Cisco.

CCO's broad range of features and services helps customers and partners to streamline business processes and improve productivity. Through CCO, you will find information about Cisco and our networking solutions, services, and programs. In addition, you can resolve technical issues with online support services, download and test software packages, and order Cisco learning materials and merchandise. Valuable online skill assessment, training, and certification programs are also available.

Customers and partners can self-register on CCO to obtain additional personalized information and services. Registered users may order products, check on the status of an order and view benefits specific to their relationships with Cisco.

You can access CCO in the following ways:

- WWW: www.cisco.com
- Telnet: cco.cisco.com
- Modem using standard connection rates and the following terminal settings: VT100 emulation; 8 data bits; no parity; and 1 stop bit.
 - From North America, call 408 526-8070
 - From Europe, call 33 1 64 46 40 82

You can e-mail questions about using CCO to cco-team@cisco.com.

Technical Assistance Center

The Cisco Technical Assistance Center (TAC) is available to warranty or maintenance contract customers who need technical assistance with a Cisco product that is under warranty or covered by a maintenance contract.

To display the TAC web site that includes links to technical support information and software upgrades and for requesting TAC support, use www.cisco.com/techsupport.

To contact by e-mail, use one of the following:

Language	E-mail Address
English	tac@cisco.com
Hanzi (Chinese)	chinese-tac@cisco.com
Kanji (Japanese)	japan-tac@cisco.com
Hangul (Korean)	korea-tac@cisco.com
Spanish	tac@cisco.com
Thai	thai-tac@cisco.com

In North America, TAC can be reached at 800 553-2447 or 408 526-7209. For other telephone numbers and TAC e-mail addresses worldwide, consult the following web site:
<http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>.

Software Configuration Tips on the Cisco Technical Assistance Center Home Page

If you have a CCO log-in account, you can access the following URL, which contains links and tips on configuring your Cisco products:

http://www.cisco.com/kobayashi/technotes/serv_tips.shtml

This URL is subject to change without notice. If it changes, point your Web browser to CCO, press **Login**, and click on this path: **Technical Assistance Center: Technical Tips**.

The following sections are provided from the Technical Tips page:

- **Access Dial Cookbook**—Contains common configurations or recipes for configuring various access routes and dial technologies.
- **Field Notices**—Notifies you of any critical issues regarding Cisco products and includes problem descriptions, safety or security issues, and hardware defects.
- **Frequently Asked Questions**—Describes the most frequently asked technical questions about Cisco hardware and software.
- **Hardware**—Provides technical tips related to specific hardware platforms.
- **Hot Tips**—Describes popular tips and hints gathered from the Cisco Technical Assistance Center (TAC). Most of these documents are available from the TAC Fax-on-demand service. To reach Fax-on-demand and receive documents at your fax machine from the United States, call 888 50-CISCO (888 502-4726). From other areas, call 650 596-4408.
- **Internetworking Features**—Lists tips on using Cisco IOS software features and services.

- **Sample Configurations**—Provides actual configuration examples that are complete with topology and annotations.

Documentation Feedback

If you are reading Cisco product documentation on the World Wide Web, you can submit technical comments electronically. Click **Feedback** in the toolbar and select **Documentation**. After you complete the form, click **Submit** to send it to Cisco.

You can e-mail your comments to bug-doc@cisco.com.

To submit your comments by mail, for your convenience many documents contain a response card behind the front cover. Otherwise, you can mail your comments to the following address:

Cisco Systems, Inc.
Document Resource Connection
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate and value your comments.

This document is to be used in conjunction with the documents listed in the “Related Documentation” section.

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